CLIMATOLOGICAL DATA FOR AUGUST, 1911.

DISTRICT No. 6, MISSOURI VALLEY.

MONTROSE W. HAYES, District Editor.

GENERAL SUMMARY.

The greater part of August was moderately cool and wet in most of the district. There were two hot periods, but they were of short duration, and there were some localities in which there was insufficient moisture, but as a rule there was very general relief from the hot, dry weather that prevailed in the lower two-thirds of the drainage area during May, June, and July. Pasturage and late crops were improved, and the ground was put in good condition for fall plowing. Local storms occurred in Montana, South Dakota, and Nebraska, and the accompanying wind and hail were destructive to crops and buildings. Floods in the Republican and Solomon Rivers in Kansas damaged crops and washed out some railroad beds. Light frost formed in localities in western Iowa and northern Nebraska on the 28th and was injurious to some late vegetables. On the latter days of the month killing frosts occurred locally in Montana, North Dakota, and northern and western South Dakota. They were considerably earlier than usual, but apparently caused minor damage only.

TEMPERATURE.

There were two periods of hot weather culminating on the 10th and 15th, and in one or both of these periods all States in the district except North Dakota had temperatures of 100° or higher. The highest was 109° on the 10th in Nebraska, Kansas, and Missouri. During the first six or seven days there was a slight deficiency in the temperature, and after the 19th or 20th there was a marked deficiency. The thermometer readings from the 25th to the end of the month were unusually low for the season, and temperatures below the freezing point occurred in parts of all the States of the district except Kansas, Missouri, and Iowa. The lowest was 16° at Bowen, Mont., on the 25th.

PRECIPITATION.

In the mountains from the Yellowstone National Park southward into Colorado, in extreme western Kansas, western Iowa, and northwestern Missouri the precipitation was deficient. The region of greatest deficiency was in an area extending for a distance of about 50 miles on either side of the Missouri-Iowa line to the west of the Grand River. The greatest excess was in north-central Kansas, Nebraska, and southern South Dakota and was caused, not by any general rain, but by heavy local showers that occurred on varying dates during the first week of the month. In eastern Kansas, southeastern Nebraska, Iowa, and Missouri the wettest periods were from the 1st to the 7th and from the 18th to the 22d. During the remainder of the month there were frequent showers, but they were very local in character and were generally light. In the other parts of the district precipitation was fairly well distributed through the first 25 days of the month, but was heaviest before the 10th. The greatest monthly total was 12.04 inches at Mount Vernon, Mo., and the greatest amount in 24 consecutive hours was 7.55 inches at Alma, Nebr., on the 2d. Traces of snow fell in Montana, Wyoming, Colorado, and South Dakota.

RIVERS.

The Missouri River was abnormally low, but its stages were by no means unprecedented. Lower stages prevailed in August of 1897, 1900, 1901, and 1910, while the stages of August, 1874, were very little higher than those that prevailed during the month just passed. At Hermann, Mo., 103 miles from the mouth of the Missouri River, there was very little fluctuation. The highest water was 8.5 feet on the 1st and the lowest was 6 feet on the 27th. The small streams as a rule had nearer a normal flow than in July. Heavy rains over the watersheds of the Republican and Solomon Rivers in Kansas caused rises in those streams to points above the flood stage. No other floods occurred.

A PHENOMENON OF LIGHTNING DISCHARGE.

By Prof. FRANCIS E. NIPHER.

Everyone has probably noticed the brief dash of large raindrops which sometimes occurs immediately after an overhead peal of thunder. I have never seen a satisfactory explanation of the cause for this phenomenon. I offer one which has been suggested from results of about five years of work on electric discharge.[1] I have published reproductions of discharge effects over photographic films which seem to fully justify the following conclusions.

Every disruptive lightning discharge which has its terminals in air terminates as sheet lightning at one end and forked lightning at the other end.

The region of sheet lightning is one in which the air molecules have less than their normal charge of negative corpuscles. It is a region in which the air is in a condition of conduction. The disruptive channel ends in a diffused discharge. Such effects are easily produced on photographic plates.

The region of forked lightning at the other end of the discharge channel is one in which the air is overcharged with negative corpuscles. This region is not a region of conduction. The channel of discharge, along which the negative corpuscles are passing to the sheet-lightning end of the discharge, here develops tributary discharge channels which penetrate to various parts of this overcharged region. They are somewhat like tributaries to a river. They have that appearance on the photographic plate when the discharge is through the air in close contact with the film. These tributaries are the so-called "forks."

Before the lightning stroke the falling negatively overloaded drops repel each other. They will not coalesce. After the discharge a large number of drops have lost their negative overcharge. But these branching discharge channels have not reached all of the drops. Some are still highly charged. These two groups of drops attract each other. They are already falling, and they coalesce as they continue their path to earth.

The forked end of the discharge is usually hidden in the rain cloud. The sheet-lightning end of it is probably above the clouds in most cases.

[1] Instructive articles containing results of this work are to be seen in Transactions of the Academy of Science of St. Louis, Vol. XIX, Nos. 1 and 4, and Vol. XX, No. 1; Proceedings of American Philosophical Society, Vol. 1, 1911; and Science of Sept. 1, 1911.—*Dist. Ed.*